CBased Environmental Pty Limited
ABN 62 611 924 264

Calga Quarry

Environmental Monitoring

Dust Deposition Gauges, Surface and Ground Waters and Meteorological Station

AMENDMENT 3

September 2019

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Environmental Scientist
Date: 18 October 2019

Executive Summary

CBased Environmental is contracted by Hanson Quarry Products to conduct environmental monitoring at the Calga Sand Quarry.

The monitoring includes;

- Dust Deposition Gauges;
- Surface Waters;
- Groundwaters; and
- Meteorological Station.

This report was prepared by CBased Environmental and includes the following;

- Dust Deposition results for September 2019;
- Surface Water quality results for September 2019;
- Bi-monthly Groundwater quality results for September 2019; and
- Meteorological report for September 2019.

The September 2019 dust deposition results for insoluble solids were variable when compared to August 2019. There were no excessively contaminated dust gauges this month. All sites, on a rolling annual average basis, are currently below the Air Quality Management Plan exceedance level of 3.7g/m^2.month. Results were found to be representative of dust levels as determined by the Australian Standard.

Monthly surface water samples were collected at sites A, B, C1, C2 and F. D was not flowing at the time of sampling. The samples were collected and analysed for a monthly sampling event. Results show pH within the slightly acidic range, low Electrical Conductivity, low Total Dissolved Solids and low Total Suspended Solids. Oil and Grease was not detected at any sites in September 2019.

Bi-monthly groundwaters were sampled on 1 October 2019. Groundwater depth generally decreased when compared to July 2019, with water moving towards the surface. pH at all sites is in the acidic range and generally remained similar or slightly decreased when compared to the previous results. EC levels were similar or decreased slightly at a majority of groundwater sites when compared to the July 2019 results.

The Calga Quarry weather station data recovery in September 2019 was approximately 100%. Data for September 2019 shows that rainfall recorded at the Calga Quarry was above the Gosford BOM mean rainfall and the Peats Ridge long term rainfall for September.

The rainfall comparison is provided below:

Calga Quarry	147.8 mm
BOM Peats Ridge*	NA
BOM Gosford*	112.6 mm
BOM Peats Ridge Long term mean for September*	69.1 mm

*Data sourced from Bureau of Meteorology (BOM) website (www.bom.gov.au).
Note: Differences in the daily rainfall readings between BOM and the Calga station may occur due to BOM stations reporting rainfall at 9am and the Calga station recording rainfall at midnight.

Sampling Program

Hanson Calga Quarry conducts environmental monitoring in accordance to Development Consent, OEH (EPA) licence and Environmental Management Plans. CBased Environmental are contracted to undertake dust deposition gauge, surface and groundwater and meteorological monitoring for the project. CBased Environmental commenced monitoring from the April 2006 monitoring period.

Dust deposition gauges are operated to the Australian Standard AS3580.10.1 "*Methods for sampling and analysis of ambient air method. Determination of particulates- deposited matter- gravimetric method*". Sampling is undertaken every 30 +/- 2 days and each gauge is analysed for insoluble solids and ash residue. The results are reported as g/m^2.month.

Surface waters are sampled in accordance with Australian Standards AS5667.1 "*Guidance on the design of sample programs, sampling techniques and the preservation and handling of samples*", AS5667.6 "*Water quality sampling—guidance on sampling of rivers and streams*" and AS5667.4 "*Water quality sampling—guidance on sampling from lakes, natural and man-made*". Surface water monitoring sites include local streams and dams. Basic analysis including pH, Electrical Conductivity, Total Suspended Solids, Total Dissolved Solids and Total Oil and Grease is conducted monthly at Sites A and F (dams) and when Sites B, C and D are flowing. Additional samples are collected when daily rainfall exceeds 50mm.

Groundwaters are sampled in accordance with Australian Standards AS5667.1 "*Guidance on the design of sample programs, sampling techniques and the preservation and handling of samples*" and AS5667.11 "*Water quality sampling—guidance on sampling of ground waters*". Groundwater monitoring sites are sampled bi-monthly for depth and water quality. Groundwater monitoring loggers continuously record water levels in a selection of bores.

Meteorological monitoring is conducted at the quarry and displayed on the site computer with a real-time display. Metrological parameters are measured according to Australian Standard AS3580.14 "*Methods for sampling and analysis of ambient air. Meteorological monitoring for ambient air quality monitoring applications*"

The weather station has the following sensor configuration;

- Air temperature
- Humidity
- Rainfall
- Atmospheric pressure
- Evaporation
- Solar radiation
- Wind speed
- Wind direction

CBased Environmental continued to operate the monitoring equipment and utilise site collections at their existing locations.

The locations of monitoring points are provided in **Figure 1**.

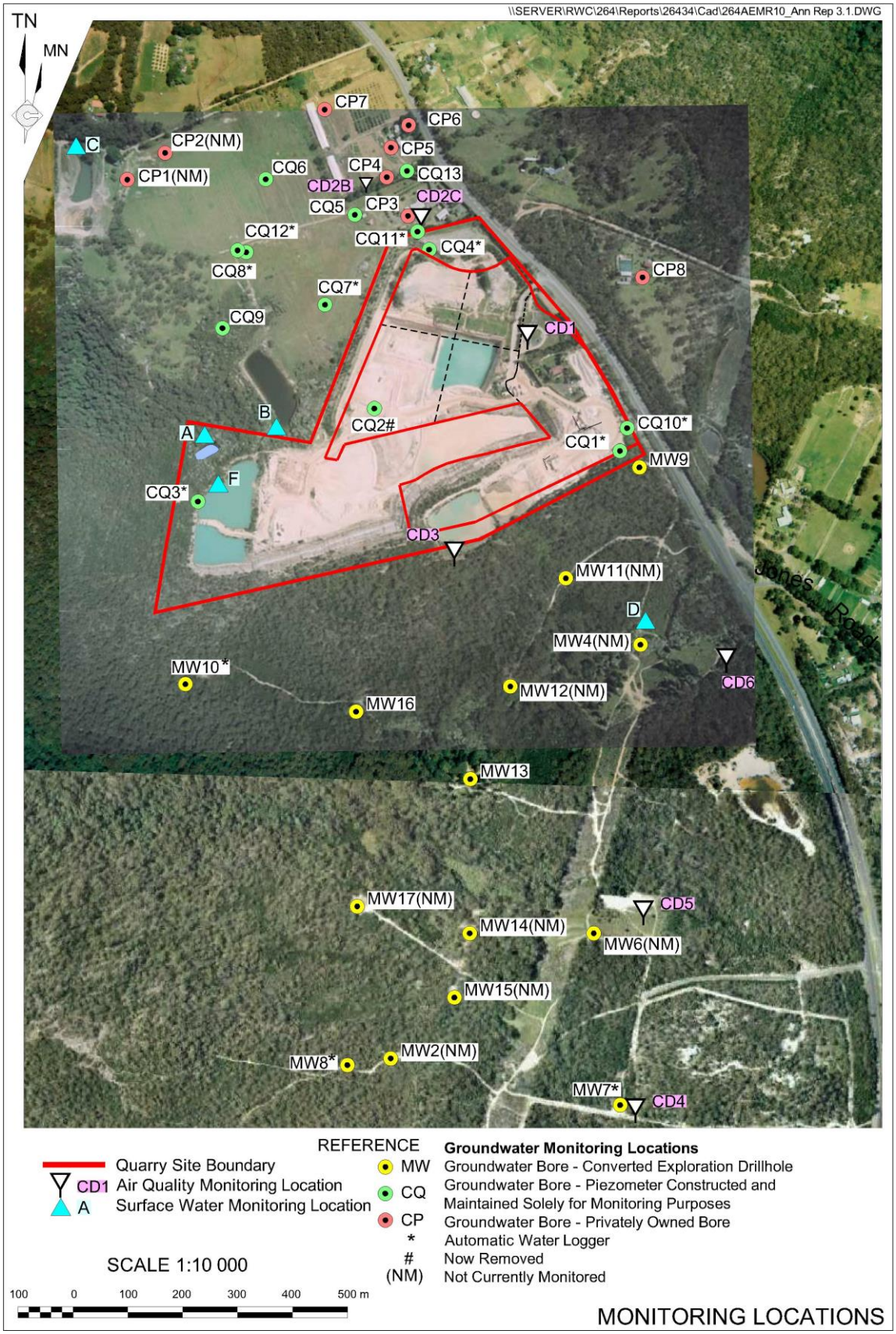


Figure 1: Hanson Calga Quarry environmental monitoring locations

2.0 Monthly Results

2.1 Dust Deposition Gauges

Table 1 displays the results for September 2019 and the project 12-month rolling average. Results are in g/m^2.month.

Table 1: Dust Deposition results: 30 August – 1 October 2019 (32 days)

Site	Monthly Insoluble Solids *(g/m^2.month)*	Monthly Ash Residue *(g/m^2.month)*	Monthly Combustible Matter *(g/m^2.month)*	Monthly Ash Residue/ Insoluble Solids %	Rolling Annual Average Insoluble Solids *(g/m^2.month)*
CD1	12[#]	11.0	1.0	92	1.9
CD2c	1.1	0.5	0.6	45	1.4
CD3	2.2	1.5	0.7	68	1.4
CD4	1.2	0.6	0.6	50	1.2
CD5	0.4	0.1	0.3	25	1.2
CD6	1.0	0.4	0.6	40	1.4

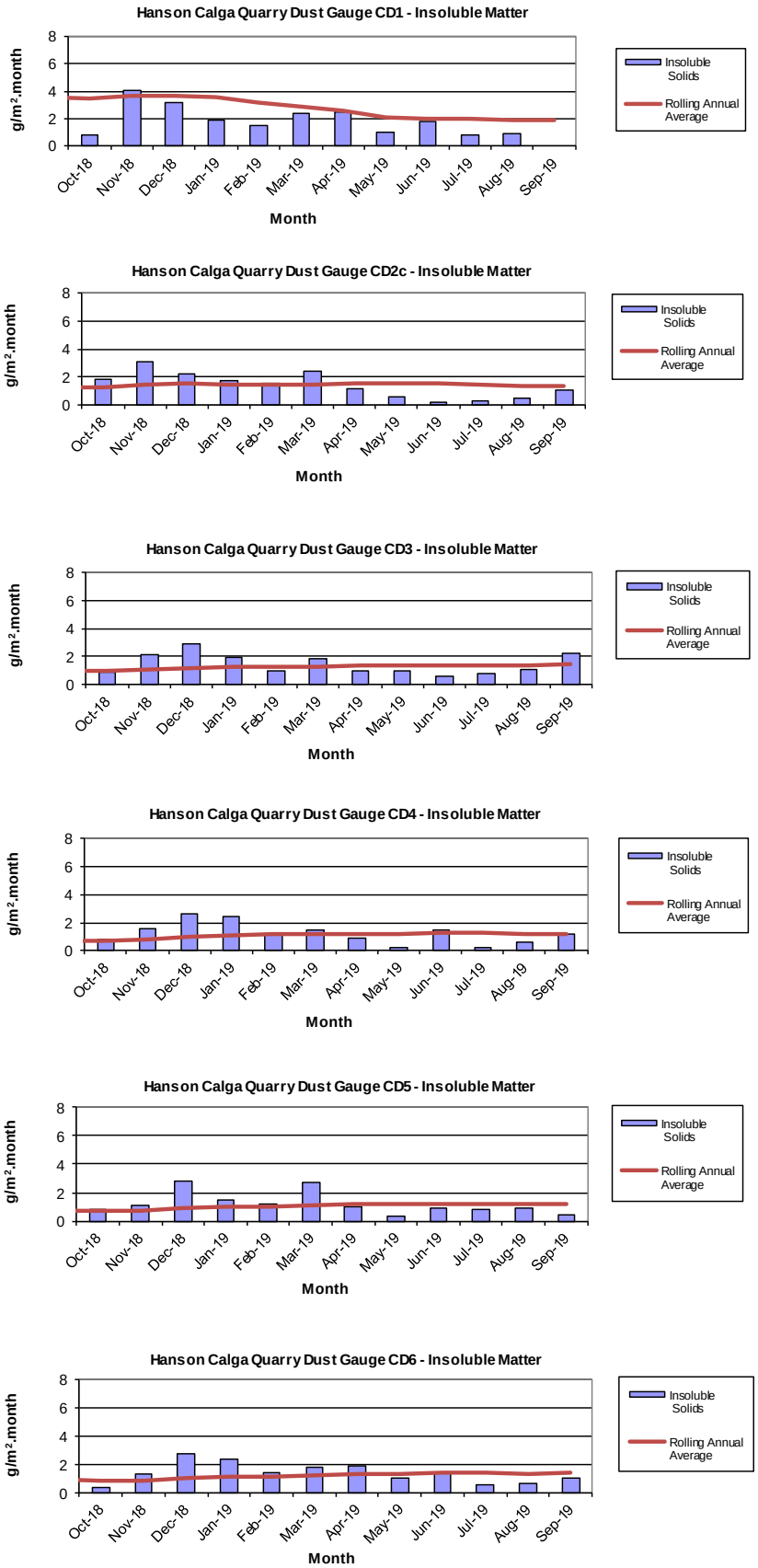
Insoluble Solids marked with an * indicate an excessively contaminated gauge. Contamination can include bird droppings, vegetation (such as plant matter, algae, pollen and seeds) and insects. Results in bold indicate insoluble solids levels above 3.7 g/m^2.month; the Development Consent's annual average amenity criteria at residential locations. The current rolling annual average is calculated from September 2018 to August 2019.

Advised by client that funnel had fallen out as the plastic lid was UV perished / damaged. Funnel and damaged lid placed back into the glass jar, unknown period that the funnel was laying on the ground. UV lid subsequently replaced by CBased during dust gauge collection. Gauge was non-compliant for an unknown period during the month (funnel not installed). Result reported for information purposes with result excluded from rolling annual average.

CD1 was installed on the 1 May 2006. CD2a was discontinued at the start of August 2006 due to quarry operations "mining out" the site of the gauge. The replacement gauge, Site CD2b, was located in a position adjacent to the boundary between B. Kashouli and F. & J. Gazzana in conformance with the Air Quality Management Plan. CD4 was installed on 3 October 2006, to gauge air quality impacts to the south of the site operations, as were CD5 and CD6 which were installed on the 14 December 2006. CD2b was discontinued at the end of January 2010 due to contamination of the gauge by non-quarry related vehicle movements on a track adjacent to the gauge. The replacement gauge, CD2c, was located on a rehabilitated section of land between the extraction area and adjacent resident.

Dust deposition charts for all dust gauge sites appear in **Figure 2** below. The laboratory analysis is provided in **Appendix 1.**

Figure 2: Dust Deposition Charts



2.2 Surface Water Monitoring

Monthly surface water monitoring was conducted on the 1 October 2019 and results are listed in **Table 2**. The laboratory analysis sheets are provided in **Appendix 1.**

Table 2: Monthly surface water monitoring – September grab sample results

Site	Observed Flow Rate	Water Colour	Turbidity	pH	EC *(µS/cm)*	TDS *(mg/L)*	TSS *(mg/L)*	Oil and Grease *(mg/L)*
A	Dam	Clear	Clear	6.42	83	60	<5	<5
B	Trickle	Clear	Clear	6.6	138	78	14	<5
C1	Dam	Clear	Clear	6.41	101	60	8	<5
C2	Steady	Clear	Clear	5.88	111	64	<5	<5
D	Still / No flow							
F	Dam	Clear	Clear	6.72	81	62	19	<5

Samples were collected at sites A, B, C1, C2 and F. D was not flowing at the time of sampling. The samples were collected and analysed for a monthly sampling event. Results show pH within the slightly acidic range, low Electrical Conductivity, low Total Dissolved Solids and low Total Suspended Solids. Oil and Grease was not detected at any sites in September 2019.

2.2.1 Non-Routine Surface Water Sampling

The following non-routine sampling was undertaken by Hanson staff in September 2019;

- Dam 1 (A), Dam 7B/C, Dam 13 (B), Point D Creek and Point C Spillway sampled 18 and 19 September 2019.
- Discharge Dam 1 (A) sampled 9, 11, 17, 23 and 30 September 2019;

Laboratory analysis certificates are provided in **Appendix 1.**

2.3 Groundwater Monitoring

Bi-monthly groundwaters were sampled on 1 October 2019. Water quality tests for pH and electrical conductivity were conducted by CBased Environmental Pty Limited. For water quality purposes, water was purged from the bore until constant pH (+/- 0.1 pH units) and Electrical Conductivity (+/- 5%) was obtained between samples. Data is displayed in **Table 3** and **Figures 3 to 6.**

Groundwater depth generally decreased when compared to July 2019, with water moving towards the surface. pH at all sites is in the acidic range and generally remained similar or slightly decreased when compared to the previous results. EC levels were similar or decreased slightly at a majority of groundwater sites when compared to the July 2019 results.

Dataloggers were also downloaded in September 2019 and emailed to site separately. No data was downloaded from CQ7, CQ8, CQ10 and CQ12 as no access was available to site as owner was not home.

Bi-monthly groundwater monitoring is next scheduled for November 2019.

Table 3: Groundwater Quality Data

Reference	Bore	Type	Depth to water TOC *(m)* April 2006	Depth to water TOC *(m)* This report	pH This report	Electrical Conductivity *(µS/cm)* This report
CQ3	Voutos	* Monitor	10.53	10.67	6.32	111
CQ4	Voutos	* Monitor	8.78	11.18	5.31	133
CQ5	Gazzana	DIP Only	8.69	No access owner not home		
CQ6	Gazzana	DIP Only	16.00	Covered over in paddock		
CQ7	Gazzana	* Monitor	6.89	No access owner not home		
CQ8	Gazzana	* Monitor	11.03	No access owner not home		
CQ9	Gazzana	DIP Only	10.10	Blocked		
CQ10	Voutos	* Monitor	NI	No access owner not home		
CQ11S	Gazzana	* Monitor	NI	11.96	5.00	149
CQ11D	Gazzana	* Monitor	NI	12.92	4.85	143
CQ12	Gazzana	* Monitor	NI	No access owner not home		
CQ13	Kashouli	* Monitor	NI	13.60	4.12	162
CP3	Gazzana	Domestic	10.40	Removed		
CP4	Kashouli	Domestic	13.63	Blocked		
CP5	Kashouli	Domestic	16.61	4.30	5.39	124
CP6	Kashouli	Domestic	16.27	9.84	4.10	147
CP7	Kashouli	Production	8.56	1.84	4.69	94
CP8	Rozmanec	Domestic	22.17	22.32	5.14	121
CP13	W P White	Domestic		11.86	4.99	157
CP15	32 Polins Road Calga	Domestic		2.24	5.27	178
MW7	Rocla Bore	* Monitor	15.76	14.50	6.72	46
MW8	Rocla Bore	* Monitor	9.82	7.44	5.10	68
MW9	Rocla Bore	* Monitor	22.44	23.94	4.23	86
MW10	Rocla Bore	* Monitor	15.41	10.37	4.94	111
MW13	Rocla Bore	DIP Only	NI	7.55	3.92	105
MW16	Rocla Bore	DIP Only	NI	8.21	4.89	106
MW17	Rocla Bore	DIP Only		9.80	4.53	116

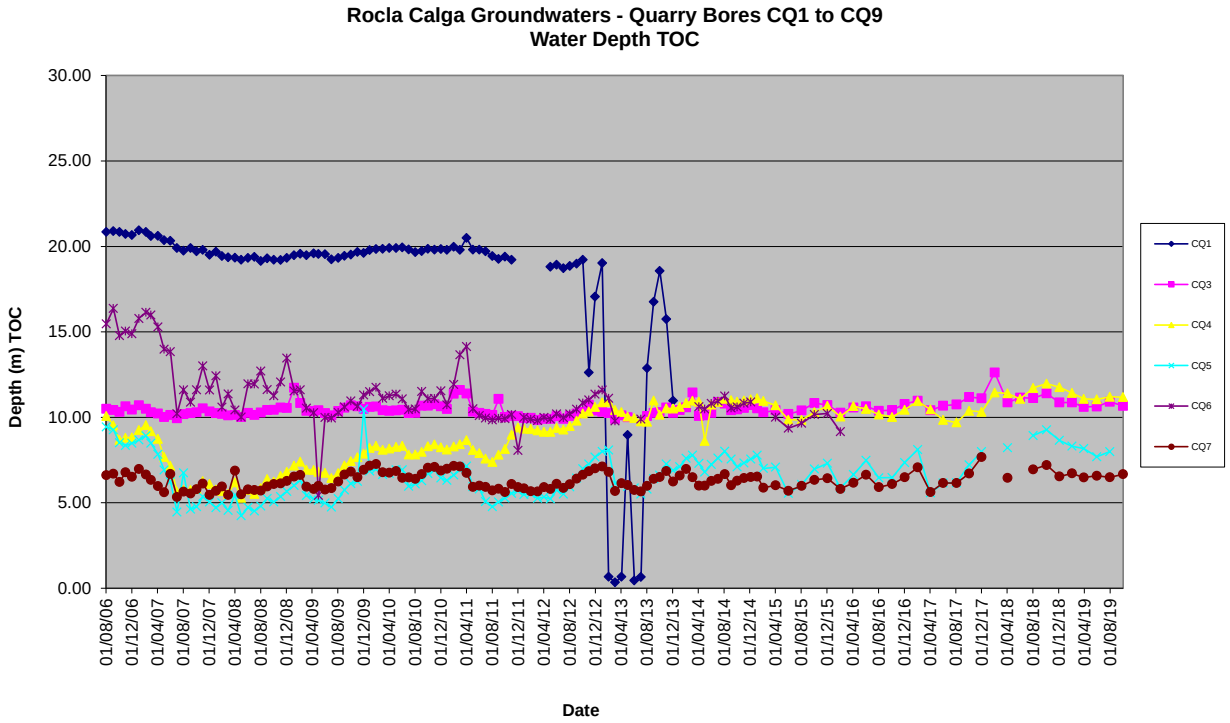
Notes:
TOC = Water level measured from top of bore case to water.
NM = Not Monitored – unable to sample water due to non-operational pump.
NR = Not Required by resident.
* = Logger Installed.
NI = These bores were not installed in April 2006 but are now operational. April 2006 was the first set of measurements taken by Carbon Based Environmental Pty Limited.

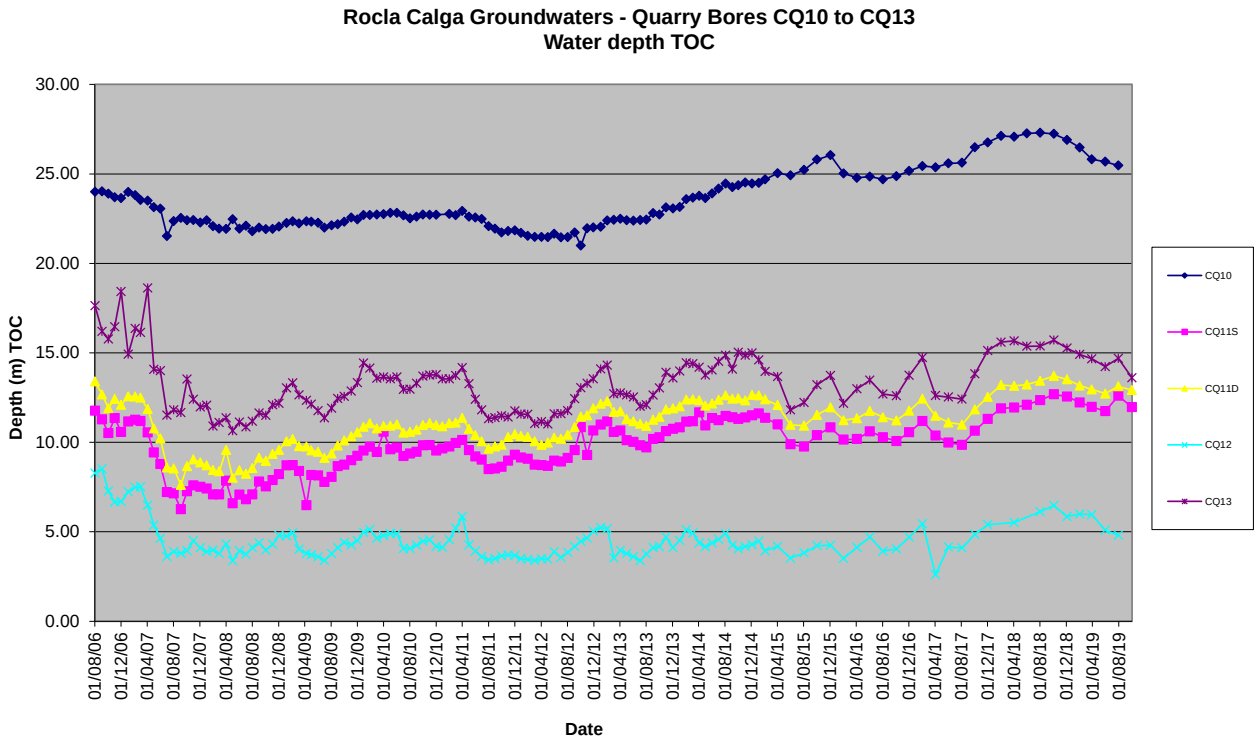
Shading is used to indicate the following trends in water depth (compared to the last reading):

	Increase to ground water depth (water moved away from surface)
	Decrease to ground water depth (water moved towards surface)
	Stable water depth (+/- 0.01m)

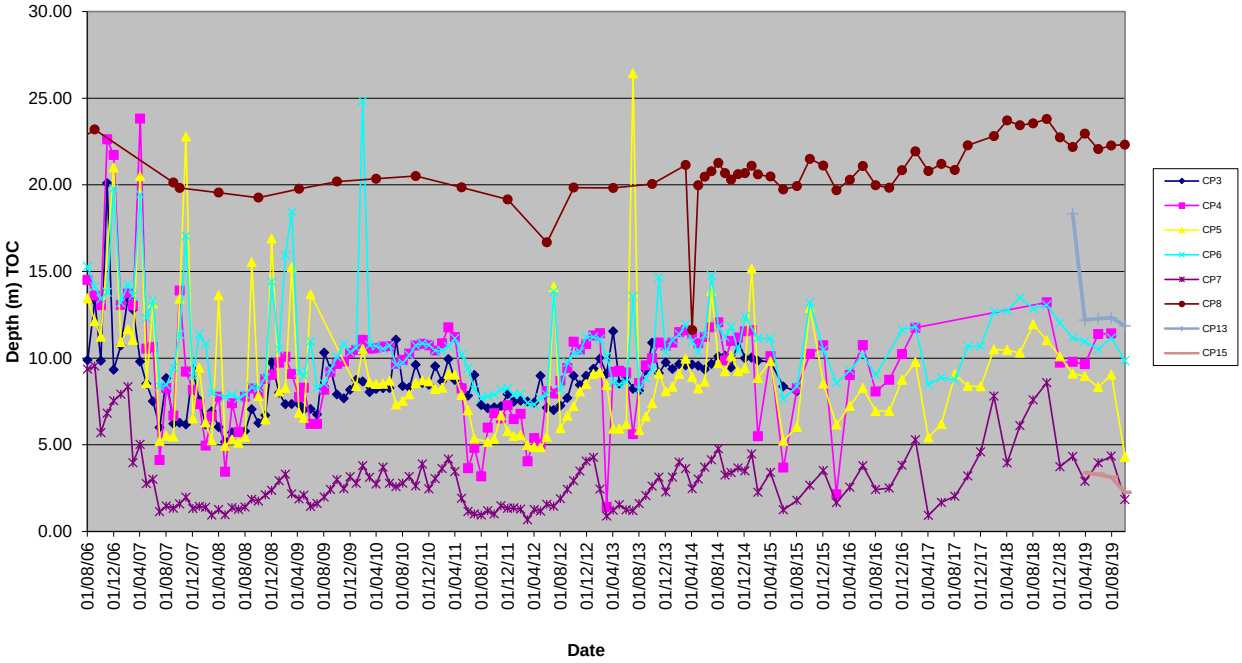
Available groundwater loggers were downloaded and will be forwarded to the Hanson Calga Quarry groundwater consultant.

Figures 3 to 6: Groundwater Depth Charts.

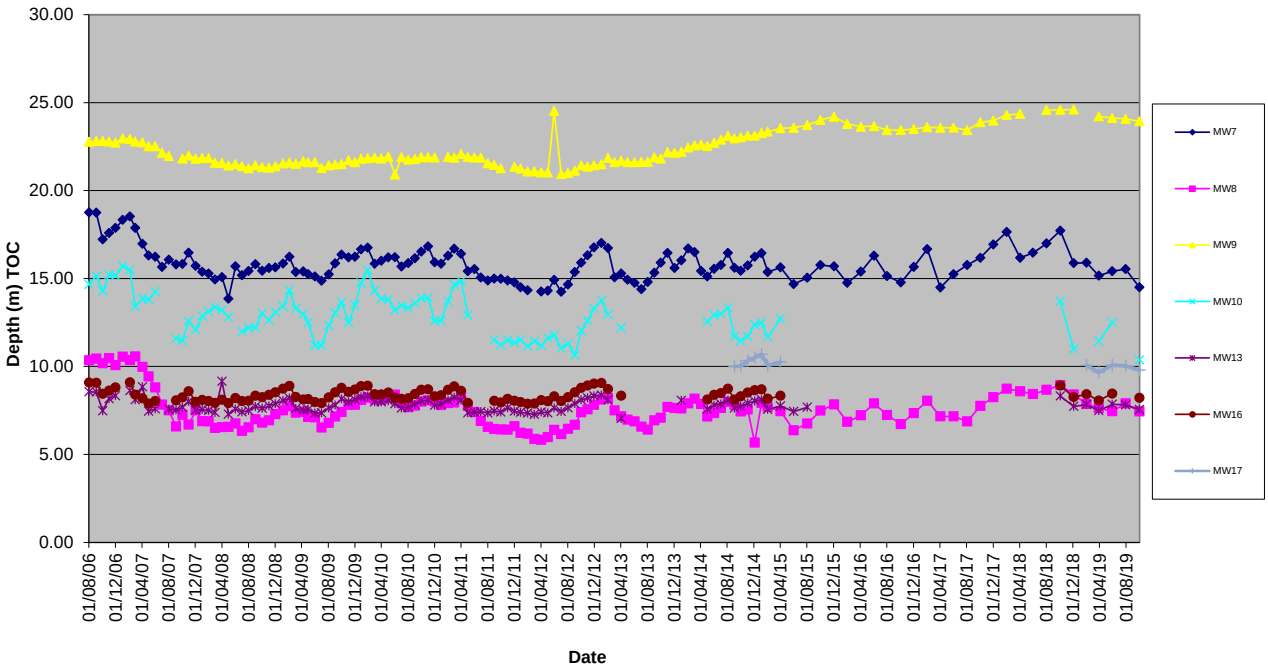




Rocla Calga Groundwaters - Quarry Bores CP3 to CP8
Water Depth TOC



Rocla Calga Groundwaters - Quarry Bores MW7 to MW17
Water Depth TOC



2.4 Meteorological Monitoring

The Calga Quarry weather station data recovery in September 2019 was approximately 100%.

The weather station data follows and includes;

- Monthly data numerical summary;
- Weather charts of air temperature, humidity, heat index and wind chill, atmospheric pressure, solar radiation, evapotranspiration, rain, wind speed and data reception; and
- Wind rose (frequency distribution diagram of wind speed and direction).

An annual calibration was undertaken on the weather station during April 2019 and is next due in April 2020.

Monthly weather statistics from the nearby Bureau of Meteorology (BOM) at Peats Ridge station are no longer available. However, the long-term rainfall mean is available via a link on the Gosford BOM Daily Weather Observation page.

Data for September 2019 shows that rainfall recorded at the Calga Quarry was above the Gosford BOM mean rainfall and the Peats Ridge long term rainfall for September.

The rainfall comparison is provided below:

Calga Quarry	147.8 mm
BOM Peats Ridge*	NA
BOM Gosford*	112.6 mm
BOM Peats Ridge Long term mean for September*	69.1 mm

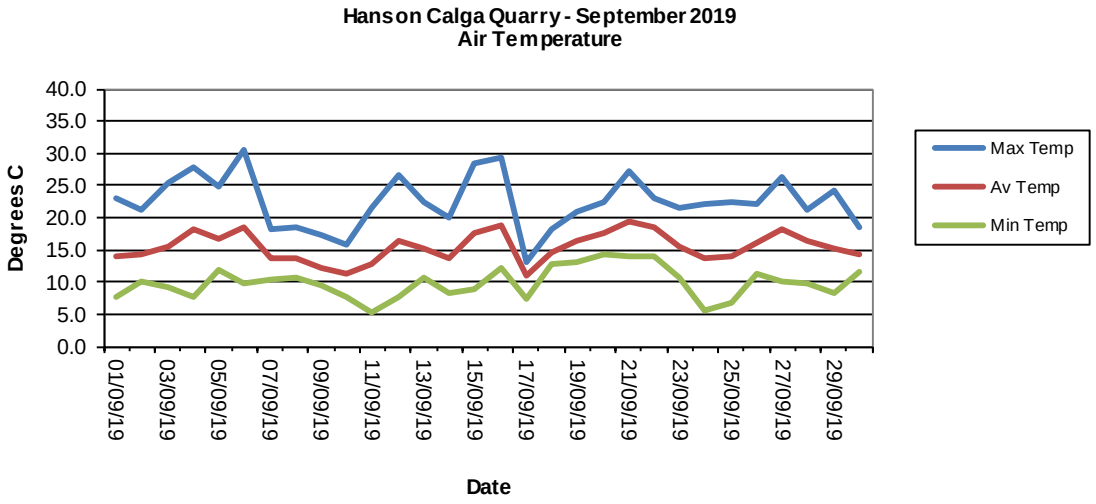
NA = Not Available
*Data sourced from Bureau of Meteorology (BOM) website (www.bom.gov.au).

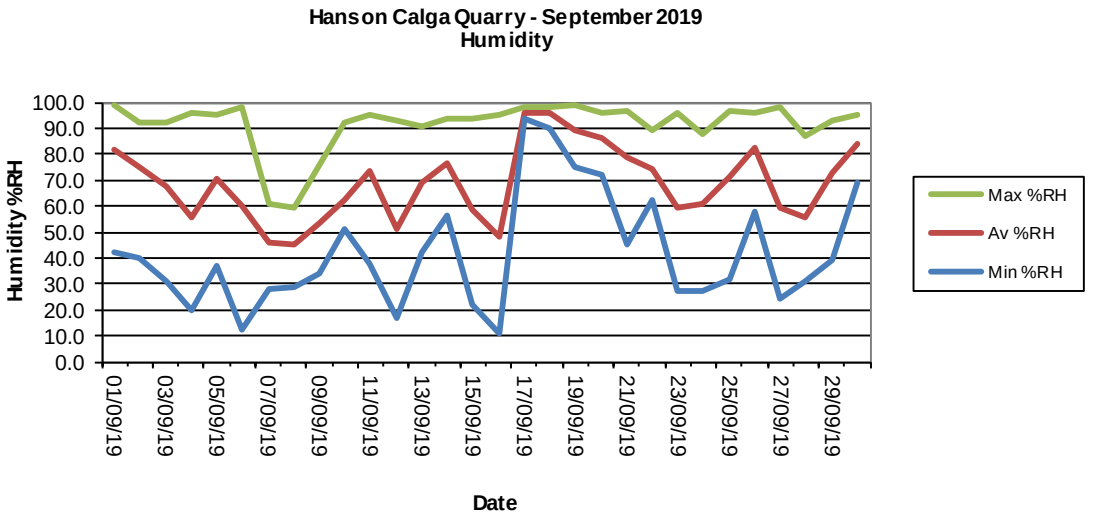
2.4.1 Monthly Meteorological Data Summary

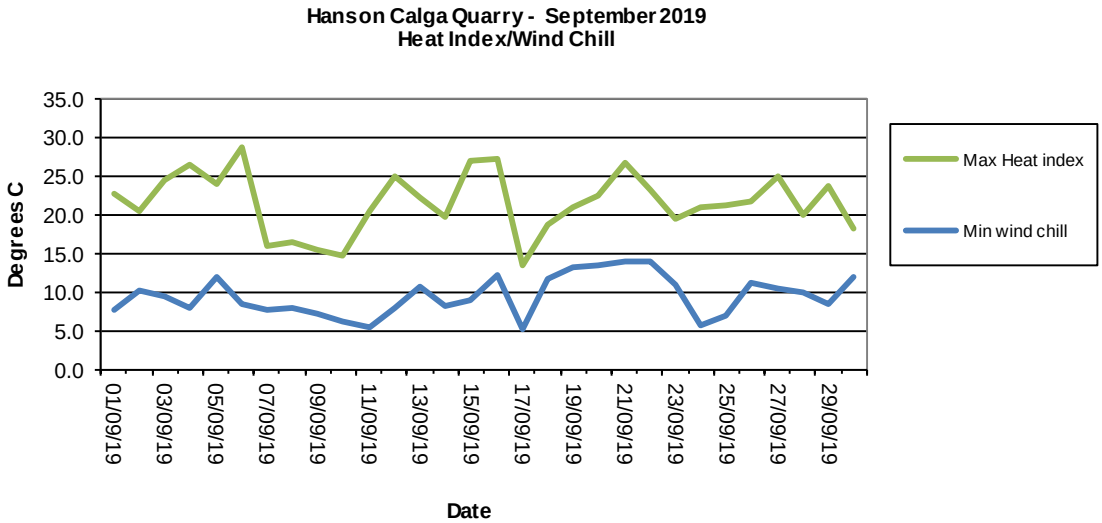
Summary **Sep-19** **Hanson - Calga**

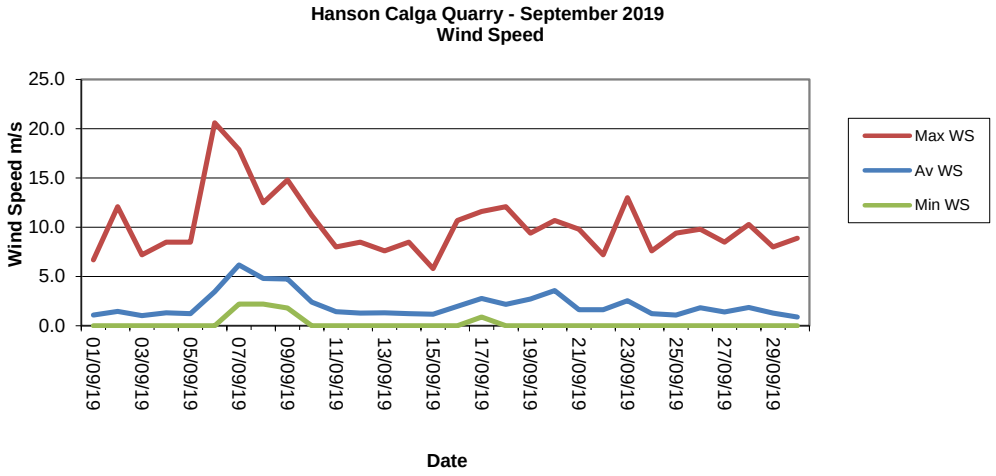
Date	Min Temp	Av Temp	Max Temp	Min %RH	Av %RH	Max %RH	RAIN mm	ET mm	Min WS	Av WS	Max WS	Min wind chill	Max Heat index	Min Atm P	Av Atm P	Max Atm P	Min Solar Rad	Av Solar Rad	Max Solar Rad	Min Data %	Av data %	Max Data %
1/09/2019	7.6	14.1	23.1	42.0	81.7	99.0	0.0	3.1	0.0	1.1	6.7	7.7	22.6	1014.4	1017.1	1019.7	0.0	209.2	751.0	74.1	88.9	97.5
2/09/2019	10.2	14.2	21.2	40.0	75.4	92.0	0.0	3.5	0.0	1.5	12.1	10.2	20.3	1013.6	1014.9	1016.7	0.0	210.6	804.0	77.9	89.6	100.0
3/09/2019	9.1	15.6	25.4	31.0	67.7	92.0	0.0	3.7	0.0	1.0	7.2	9.3	24.5	1010.5	1013.2	1015.9	0.0	210.9	779.0	81.4	93.2	100.0
4/09/2019	7.8	18.2	27.9	20.0	55.8	96.0	0.0	4.5	0.0	1.3	8.5	7.9	26.4	1007.7	1011.0	1013.0	0.0	213.2	773.0	73.8	88.8	100.0
5/09/2019	11.9	16.8	24.8	37.0	70.4	95.0	0.0	3.7	0.0	1.2	8.5	11.9	23.9	1009.3	1011.3	1014.1	0.0	209.6	761.0	71.3	87.0	96.2
6/09/2019	9.7	18.5	30.6	12.0	60.3	98.0	0.6	5.5	0.0	3.5	20.6	8.4	28.6	993.9	1001.7	1009.7	0.0	190.5	791.0	63.1	83.7	100.0
7/09/2019	10.3	13.6	18.1	28.0	45.7	61.0	0.0	6.6	2.2	6.2	17.9	7.6	15.9	1000.8	1004.8	1008.1	0.0	224.8	805.0	92.4	96.6	100.0
8/09/2019	10.7	13.6	18.6	29.0	45.0	59.0	0.0	5.7	2.2	4.8	12.5	8.0	16.5	1006.1	1008.0	1010.1	0.0	220.2	800.0	92.4	95.9	99.7
9/09/2019	9.6	12.2	17.2	34.0	53.4	76.0	0.8	4.7	1.8	4.8	14.8	7.1	15.3	1005.0	1009.7	1017.1	0.0	195.2	934.0	75.7	88.9	97.5
10/09/2019	7.8	11.2	15.7	51.0	62.6	92.0	0.0	3.0	0.0	2.4	11.2	6.2	14.7	1017.1	1021.8	1026.9	0.0	136.1	671.0	68.5	92.0	98.4
11/09/2019	5.4	12.7	21.5	38.0	73.8	95.0	0.0	3.6	0.0	1.4	8.0	5.5	20.4	1024.0	1025.9	1028.6	0.0	226.5	806.0	84.9	92.4	100.0
12/09/2019	7.8	16.5	26.6	17.0	51.1	93.0	0.0	4.1	0.0	1.3	8.5	7.9	24.9	1013.7	1018.1	1023.9	0.0	194.4	825.0	65.9	87.6	100.0
13/09/2019	10.6	15.2	22.4	42.0	68.7	91.0	0.0	3.5	0.0	1.3	7.6	10.7	22.1	1014.7	1017.9	1021.5	0.0	198.9	963.0	74.8	92.4	100.0
14/09/2019	8.2	13.7	19.9	56.0	76.3	94.0	0.0	3.1	0.0	1.2	8.5	8.2	19.6	1015.4	1019.0	1021.3	0.0	187.4	875.0	83.3	92.6	97.5
15/09/2019	8.8	17.7	28.4	22.0	58.7	94.0	0.0	4.4	0.0	1.2	5.8	8.8	26.9	1014.6	1017.4	1020.7	0.0	227.4	825.0	85.5	92.5	97.2
16/09/2019	12.3	18.7	29.2	11.0	48.2	95.0	1.0	4.2	0.0	2.0	10.7	12.1	27.2	1008.7	1013.3	1017.6	0.0	161.7	942.0	73.5	91.7	100.0
17/09/2019	7.3	10.9	13.2	94.0	96.1	98.0	64.0	0.3	0.9	2.8	11.6	5.1	13.4	1016.3	1018.1	1020.3	0.0	21.9	137.0	75.4	86.6	95.3
18/09/2019	12.9	14.6	18.1	90.0	96.2	98.0	78.2	0.7	0.0	2.2	12.1	11.7	18.6	1019.1	1020.8	1022.6	0.0	45.0	447.0	75.1	89.2	100.0
19/09/2019	13.1	16.4	20.8	75.0	89.5	99.0	2.6	2.3	0.0	2.7	9.4	13.1	20.9	1021.0	1022.5	1024.0	0.0	120.8	747.0	53.9	78.1	92.1
20/09/2019	14.4	17.6	22.3	72.0	85.9	96.0	0.0	2.9	0.0	3.6	10.7	13.5	22.5	1018.8	1021.4	1023.9	0.0	145.3	752.0	65.9	82.4	100.0
21/09/2019	13.9	19.3	27.1	45.0	79.0	97.0	0.0	3.3	0.0	1.6	9.8	13.9	26.7	1013.9	1016.6	1019.4	0.0	176.5	804.0	81.4	89.5	94.6
22/09/2019	13.9	18.4	23.1	62.0	74.2	89.0	0.2	2.9	0.0	1.6	7.2	14.0	23.2	1013.5	1016.7	1019.4	0.0	142.2	895.0	90.5	96.3	100.0
23/09/2019	10.8	15.5	21.6	27.0	59.7	96.0	0.0	5.0	0.0	2.5	13.0	10.8	19.3	1016.7	1019.6	1022.9	0.0	237.4	947.0	71.3	93.4	100.0
24/09/2019	5.5	13.6	22.1	27.0	60.9	88.0	0.0	4.4	0.0	1.2	7.6	5.6	20.8	1020.0	1022.6	1024.6	0.0	257.0	879.0	84.2	92.0	100.0
25/09/2019	6.8	14.0	22.5	32.0	71.4	97.0	0.2	4.1	0.0	1.1	9.4	6.8	21.2	1021.7	1023.6	1025.3	0.0	256.2	878.0	71.9	93.0	100.0
26/09/2019	11.2	15.9	22.1	58.0	82.7	96.0	0.0	3.2	0.0	1.8	9.8	11.2	21.6	1018.4	1021.2	1024.0	0.0	196.9	989.0	68.5	87.3	100.0
27/09/2019	10.2	18.2	26.2	24.0	59.6	98.0	0.0	4.8	0.0	1.4	8.5	10.3	24.9	1010.4	1014.2	1018.4	0.0	244.5	906.0	65.9	86.3	100.0
28/09/2019	9.9	16.3	21.1	31.0	55.8	87.0	0.0	4.8	0.0	1.9	10.3	9.9	19.8	1009.0	1012.9	1017.0	0.0	250.6	894.0	72.6	86.4	95.9
29/09/2019	8.3	15.3	24.3	39.0	72.7	93.0	0.0	4.2	0.0	1.3	8.0	8.4	23.6	1012.0	1015.3	1018.3	0.0	253.7	978.0	74.8	89.7	98.7
30/09/2019	11.7	14.2	18.4	69.0	84.0	95.0	0.2	1.6	0.0	0.9	8.9	11.8	18.2	1017.3	1021.5	1026.5	0.0	88.6	667.0	72.2	90.7	97.8
Monthly	5.4	15.4	30.6	11	69	99	147.8	111.3	0	2.1	20.6	5.1	28.6	993.9	1016.4	1028.6	0	188.4	989	53.9	89.8	100

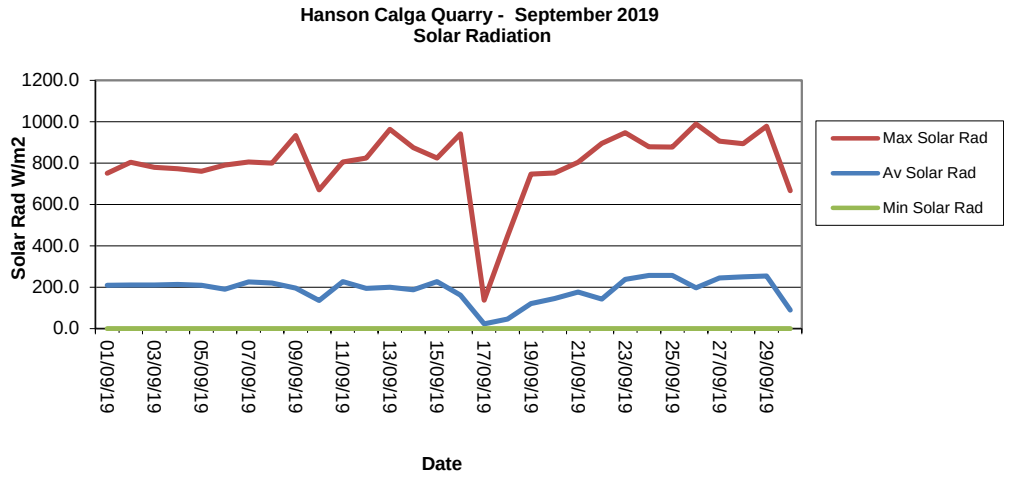
2.4.2 Monthly Weather Charts

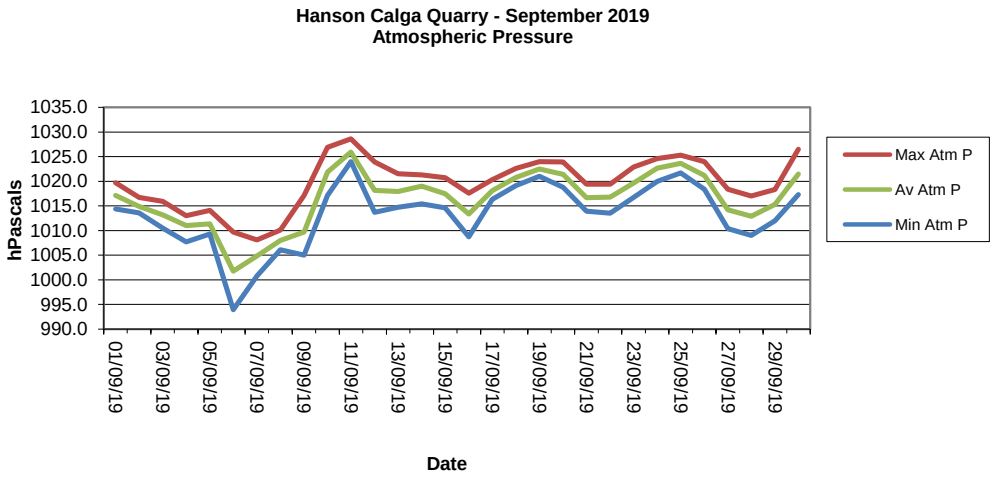




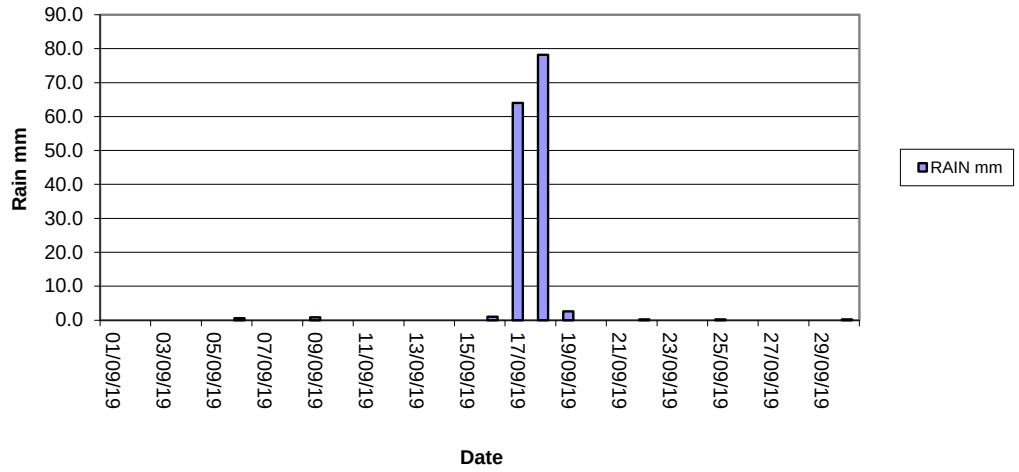



Hanson Calga Quarry - September 2019
Wind Speed
Wind Speed m/s
25.0
20.0
15.0
10.0
5.0
0.0
01/09/19
03/09/19
05/09/19
07/09/19
09/09/19
11/09/19
13/09/19
15/09/19
17/09/19
19/09/19
21/09/19
23/09/19
25/09/19
27/09/19
29/09/19
Date
Max WS
Av WS
Min WS

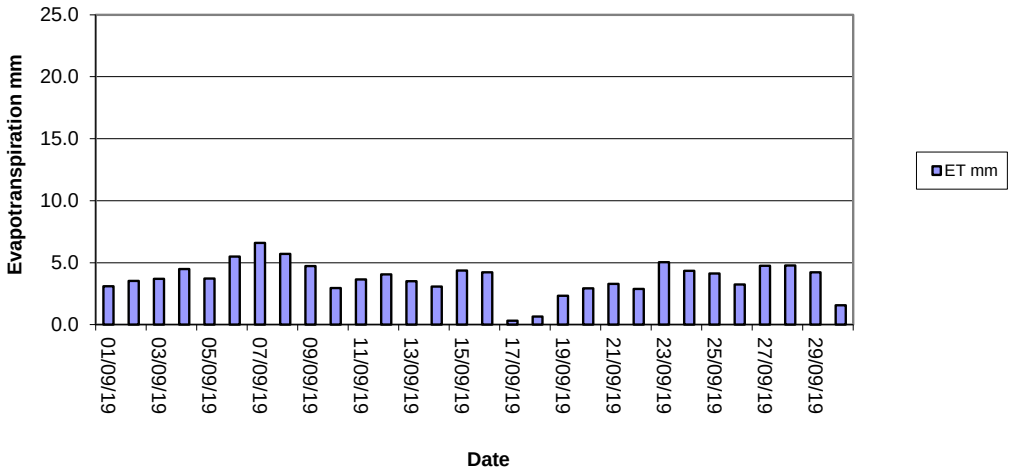

Hanson Calga Quarry - September 2019
Solar Radiation
Solar Rad W/m2
1200.0
1000.0
800.0
600.0
400.0
200.0
0.0
01/09/19
03/09/19
05/09/19
07/09/19
09/09/19
11/09/19
13/09/19
15/09/19
17/09/19
19/09/19
21/09/19
23/09/19
25/09/19
27/09/19
29/09/19
Date
Max Solar Rad
Av Solar Rad
Min Solar Rad


Hanson Calga Quarry - September 2019
Atmospheric Pressure
hPascals
1035.0
1030.0
1025.0
1020.0
1015.0
1010.0
1005.0
1000.0
995.0
990.0
01/09/19
03/09/19
05/09/19
07/09/19
09/09/19
11/09/19
13/09/19
15/09/19
17/09/19
19/09/19
21/09/19
23/09/19
25/09/19
27/09/19
29/09/19
Date
Max Atm P
Av Atm P
Min Atm P

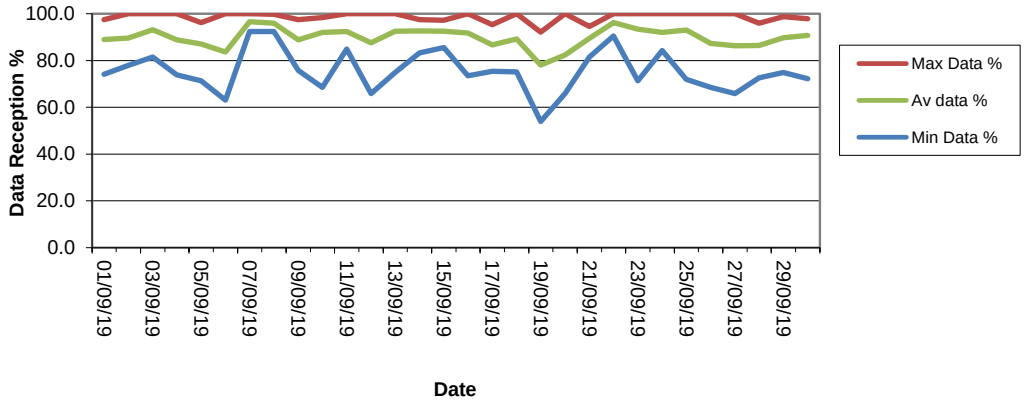
Hanson Calga Quarry - September 2019
Rainfall



Hanson Calga Quarry - September 2019
Evapotranspiration



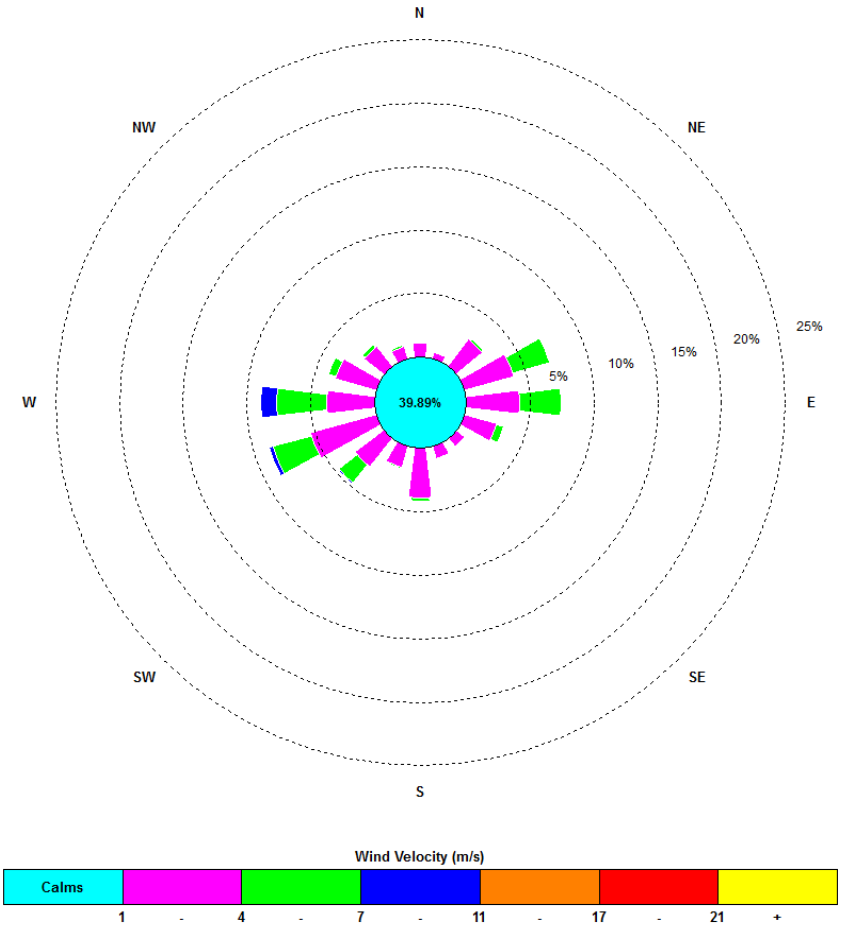
Hanson Calga Quarry - September 2019
Data Reception



2.4.3 Monthly Windrose Plot

Frequency plot of the average wind speed and average direction over each 15-minute sampling period. Wind is considered to be calm when at less than a 15-minute average of 1m/s.

0:00, 1 September 2019 – 23: 45, 30 September 2019



The predominant winds were from the W, with most frequent, strongest winds from the W. The maximum wind speed was 20.6 m/s from the WNW.

Appendix 1

Field Sheets

Chain of Custody

Laboratory Certificates

DEPOSITIONAL DUST MONITORING

Client: ..... **Hanson Calga Quarry** .....

Date Installed: 30-8-19

Date Collected: 1-10-19

Sampled By: Leesa + Matt

Site	Time Collected	Water Level (mL)	Insoluble Material (✓ = slight, ✓✓ = mod etc)				Water Turbidity	Water Colour	Stand Level (Y/N)	Funnel Level (Y/N)	New Funnel Diameter (mm)	Comments
			Insects	Bird droppings	Vegetation	Dust						
CD1	10.30	2000	✓		✓	✓	(C) S T	(C) O Bn Gn Gy	Y	Y	–	See Comment
CD2C	12.50	2000	✓	✓	✓	✓	(C) S T	(C) O Bn Gn Gy	Y	Y	–	
CD3	10.10	2000	✓		✓	✓	(C) S T	(C) O Bn Gn Gy	Y	Y	–	
CD4	1.40	2000	✓✓✓		✓	✓	C (S) T	(C) O Bn Gn Gy	Y	Y	–	
CD5	2.10	2000	✓			✓	(C) S T	(C) O Bn Gn Gy	Y	Y	–	
CD6	2.15	2000	✓	✓	✓	✓	(C) S T	(C) O Bn Gn Gy	Y	Y	–	

Turbidity: C=Clear, S= Slight, T=Turbid (CIRCLE)

Colour: C=Colourless, O=Orange, Bn=Brown, Gn=Green, Gy = Grey (CIRCLE)

Report broken funnels and replacement diameters

Signed: _____

* advised by client that funnel was removed from Gauge and client re-installed.

CHAIN OF CUSTODY DOCUMENTATION

CLIENT: CBased Environmental Pty Ltd

POSTAL ADDRESS: 47 Boomerang St CESSNOCK NSW 2325

SEND REPORT TO: monitoringresults@cbased.com.au

SEND INVOICE TO: accounts@cbased.com.au, renae.mikka@cbased.com.au

DATA NEEDED BY: 7 working days

REPORT NEEDED BY: 7 working days

PROJECT ID: Hanson Calga Dusts

QUOTE NO.: SYBQ 403-18

P.O. NO.:

COMMENTS/SPECIAL HANDLING/STORAGE OR DIPOSAL:

FOR LAB USE ONLY
COOLER SEAL
Yes ..... No .....
Broken ..... Intact ...
COOLER TEMP: deg.C

Total unless specified

LABORATORY BATCH NO.:

SAMPLERS: Leesa + Mat

PHONE: 0265713334 E-MAIL: monitoringresults@cbased.com.au

REPORT FORMAT: HARD: Yes FAX: DISK: BULLETIN BOARD: E-MAIL: Yes

QC LEVEL: QCS1: QCS2: QCS3: Yes QCS4:

Australian Laboratory Services Pty Ltd

ANALYSIS REQUIRED

SAMPLE DATA				CONTAINER DATA		Insoluable Solids	Ash Residue	Combustable Matte	NOTES
SAMPLE ID	MATRIX	DATE ON	DATE OFF	TYPE & PRESERVATIVE	NO.				
CD1	Dust	30-8-19	1-10-19			x	x	x	
CD2c	Dust					x	x	x	
CD3	Dust					x	x	x	
CD4	Dust					x	x	x	
CD5	Dust					x	x	x	
CD6	Dust					x	x	x	

Environmental Division Newcastle
Work Order Reference
EN1906913

Telephone : +61 2 4014 2500

RELINQUISHED BY:

NAME : M Tracey DATE: 2.10.19

OF: CBased Environmental TIME:

NAME : DATE:

OF: TIME:

RECEIVED BY

NAME : DATE: 02/10/19

OF: TIME: 1.16 pm

NAME : DATE:

OF: TIME:

METHOD OF SHIPMENT

CONSIGNMENT NOTE NO.

TRANSPORT CO. NAME.

*Container Type and Preservative Codes: P = Neutral Plastic; N = Nitric Acid Preserved; C = Sodium Hydroxide Preserved; J = Solvent Washed Acid Rinced Jar; S = Solvent Washed Acid Rinced Glass Bottle; VC = Hydrochloric Acid Preserved Vial; VS = Sulfuric Acid Preserved Vial; BS = Sulfuric Acid Preserved Glass Bottle; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; O = Other.

AUSTRALIAN LABORATORY SERVICES P/L

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EN1906913**	Page	: 1 of 4
Client	: **CBASED ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Newcastle
Contact	: All Deliverables	Contact	:
Address	: Unit 3 2 Enterprise Cres Singleton NSW 2330	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
Telephone	: +61 02 6571 3334	Telephone	: +61 2 4014 2500
Project	: Hanson Calga Dusts	Date Samples Received	: 02-Oct-2019 13:16
Order number	: ----	Date Analysis Commenced	: 03-Oct-2019
C-O-C number	: ----	Issue Date	: 09-Oct-2019 19:09
Sampler	: Leesa King, Matt Wilkin		
Site	:		
Quote number	: SYBQ/403/18 - COMPASS		
No. of samples received	: 6		
No. of samples analysed	: 6		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Analysis as per AS3580.10.1-2016. Samples passed through a 1mm sieve prior to analysis. NATA accreditation does not apply for results reported in g/m².mth as sampling data was provided by the client.

Analytical Results

Sub-Matrix: **DEPOSITIONAL DUST** (Matrix: **AIR**)				Client sample ID	CD1 30/08/19 - 01/10/19	CD2c 30/08/19 - 01/10/19	CD3 30/08/19 - 01/10/19	CD4 30/08/19 - 01/10/19	CD5 30/08/19 - 01/10/19
				Client sampling date / time	01-Oct-2019 00:00	01-Oct-2019 00:00	01-Oct-2019 00:00	01-Oct-2019 00:00	01-Oct-2019 00:00
Compound	*CAS Number*	*LOR*	*Unit*		**EN1906913-001**	**EN1906913-002**	**EN1906913-003**	**EN1906913-004**	**EN1906913-005**
					Result	Result	Result	Result	Result
EA120: Ash Content									
Ash Content	----	0.1	g/m².month		**11.0**	**0.5**	**1.5**	**0.6**	**0.1**
Ash Content (mg)	----	1	mg		**208**	**9**	**29**	**12**	**2**
EA125: Combustible Matter									
Combustible Matter	----	0.1	g/m².month		**1.0**	**0.6**	**0.7**	**0.6**	**0.3**
Combustible Matter (mg)	----	1	mg		**19**	**12**	**13**	**10**	**5**
EA141: Total Insoluble Matter									
Total Insoluble Matter	----	0.1	g/m².month		**12.0**	**1.1**	**2.2**	**1.2**	**0.4**
Total Insoluble Matter (mg)	----	1	mg		**227**	**21**	**42**	**22**	**7**

Analytical Results

Sub-Matrix: **DEPOSITIONAL DUST** (Matrix: **AIR**)				Client sample ID	**CD6 30/08/19 - 01/10/19**	**----**	**----**	**----**	**----**
				Client sampling date / time	01-Oct-2019 00:00	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*		**EN1906913-006**	**--------**	**--------**	**--------**	**--------**
					Result	----	----	----	----
EA120: Ash Content									
Ash Content	----	0.1	g/m².month		**0.4**	**----**	**----**	**----**	**----**
Ash Content (mg)	----	1	mg		**8**	**----**	**----**	**----**	**----**
EA125: Combustible Matter									
Combustible Matter	----	0.1	g/m².month		**0.6**	**----**	**----**	**----**	**----**
Combustible Matter (mg)	----	1	mg		**11**	**----**	**----**	**----**	**----**
EA141: Total Insoluble Matter									
Total Insoluble Matter	----	0.1	g/m².month		**1.0**	**----**	**----**	**----**	**----**
Total Insoluble Matter (mg)	----	1	mg		**19**	**----**	**----**	**----**	**----**

CBASED ENVIRONMENTAL PTY LIMITED

Date: 1-10-19

Client : Hanson Calga

Project :

SURFACE WATERS

Site	Flow Rate	Odour	Sampling Time	Bottles	Water Turbidity	Water Colour	Comments
A	Dam	No	9.35	1x 250ml GP, 1x 500mL GP, 1x PG	(C) S T	(C) LO O B G	
B	Trickle	No	8.50	1x 250ml GP, 1x 500mL GP, 1x PG	(C) S T	(C) LO O B G	
C1	Dam	No	10.30	1x 250ml GP, 1x 500mL GP, 1x PG	(C) S T	(C) LO O B G	
C2	Steady	No	10.40	1x 250ml GP, 1x 500mL GP, 1x PG	(C) S T	(C) LO O B G	
D	Stty			1x 250ml GP, 1x 500mL GP, 1x PG	C S T	C LO O B G	
F	DAm	No	9.15	1x 250ml GP, 1x 500mL GP, 1x PG	(C) S T	(C) LO O B G	

Turbidity: C=Clear, S= Slight, T=Turbid (CIRCLE)

Colour: C=Clear, LO=Light Orange, O=Orange, B=Brown, G=Green (CIRCLE)

Signed: Lkij

Sampled by: Leesa + Mat.

CHAIN OF CUSTODY DOCUMENTATION

Australian Laboratory Services Pty Ltd

CLIENT: CBased Environmental Pty Ltd

POSTAL ADDRESS: PO Box 245 CESSNOCK NSW 2325

SEND REPORT TO: monitoringresults@cbased.com.au

SEND INVOICE TO: renae.mikka@cbased.com.au; accounts@cbased.com.au

DATA NEEDED BY: 5 working days

REPORT NEEDED BY: 5 working days

PROJECT ID: Hanson Quarry SW

QUOTE NO.: SYBQ-403-18

P.O. NO.:

COMMENTS/SPECIAL HANDLING/STORAGE OR DIPOSAL:

FOR LAB USE ONLY
COOLER SEAL
Yes ..... No .....
Broken ..... Intact ..
COOLER TEMP: deg.C

Total unless specified

LABORATORY BATCH NO.:

SAMPLERS:CBased Environmental Pty Ltd Leesa + Matt

PHONE: 0265713334 E-MAIL: monitoringresults@cbased.com.au

REPORT FORMAT: HARD: Yes FAX: DISK: BULLETIN BOARD: E-MAIL: Yes

QC LEVEL: QCS1: QCS2: QCS3: Yes QCS4:

ANALYSIS REQUIRED

SAMPLE DATA				CONTAINER DATA		pH	EC	TSS	TDS	O + G	NOTES
SAMPLE ID	MATRIX	DATE	TIME	TYPE & PRESERVATIVE	NO.						
A	Water	1-10-19	9-35	1x 250mlGP,1x 500mLGP,1xPG		x	x	x	x	x	
B	Water		8-50	1x 250mlGP,1x 500mLGP,1xPG		x	x	x	x	x	
C1	Water		10-30	1x 250mlGP,1x 500mLGP,1xPG		x	x	x	x	x	
C2	Water		10-40	1x 250mlGP,1x 500mLGP,1xPG		x	x	x	x	x	
~~D~~	~~Water~~			~~1x 250mlGP,1x 500mLGP,1xPG~~		~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	
F	Water		9-15	1x 250mlGP,1x 500mLGP,1xPG		x	x	x	x	x	
				TOTAL BOTTLES:							

Environmental Division Sydney
Work Order Reference
ES1932172

Telephone : + 61-2-8784 8555

RELINQUISHED BY:

NAME : MTracey DATE: 2.10.19

OF: CBased Environmental TIME:

NAME : DATE:

OF: TIME:

RECEIVED BY

NAME : MM DATE: 02/10/19

OF: TIME: 1:40pm

NAME : DATE:

OF: TIME:

METHOD OF SHIPMENT

CONSIGNMENT NOTE NO.

TRANSPORT CO. NAME.

*Container Type and Preservative Codes: P = Neutral Plastic; N = Nitric Acid Preserved; C = Sodium Hydroxide Preserved; J = Solvent Washed Acid Rinced Jar; S = Solvent Washed Acid Rinced Glass Bottle; VC = Hydrochloric Acid Preserved Vial; VS = Sulfuric Acid Preserved Vial; BS = Sulfuric Acid Preserved Glass Bottle; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; O = Other.

AUSTRALIAN LABORATORY SERVICES P/L

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1932172**	Page	: 1 of 2
Client	: **CBASED ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: All Deliverables	Contact	: Customer Services ES
Address	: Unit 3 2 Enterprise Cres Singleton NSW 2330	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 6571 3334	Telephone	: +61-2-8784 8555
Project	: Hanson Quarry SW	Date Samples Received	: 02-Oct-2019 13:18
Order number	: ----	Date Analysis Commenced	: 02-Oct-2019
C-O-C number	: ----	Issue Date	: 09-Oct-2019 10:32
Sampler	: Leesa + Matt		
Site	:		
Quote number	: SYBQ/403/18 - COMPASS		
No. of samples received	: 5		
No. of samples analysed	: 5		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Neil Martin	Team Leader - Chemistry	Chemistry, Newcastle West, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

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Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			Client sample ID	A	B	C1	C2	F
			Client sampling date / time	01-Oct-2019 09:35	01-Oct-2019 08:50	01-Oct-2019 10:30	01-Oct-2019 10:40	01-Oct-2019 09:15
Compound	*CAS Number*	*LOR*	*Unit*	**ES1932172-001**	**ES1932172-002**	**ES1932172-003**	**ES1932172-004**	**ES1932172-005**
				Result	Result	Result	Result	Result
EA005: pH								
pH Value	----	0.01	pH Unit	**6.42**	**6.60**	**6.41**	**5.88**	**6.72**
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**83**	**138**	**101**	**111**	**81**
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**60**	**78**	**60**	**64**	**62**
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	**14**	**8**	<5	**19**
EP020: Oil and Grease (O&G)								
Oil & Grease	----	5	mg/L	<5	<5	<5	<5	<5

C BASED ENVIRONMENTAL PTY LIMITED

Date: 1.10.19

Client : Hanson Calga
Project : Bi-Annual Bores

GROUNDWATERS

Site	Time	DEPTH	Typical Depth (m)	Odour	Water Turbidity	Water Colour	1		2		Bottles (Apr/Oct)	Downloaded Logger? (Y/N)*	Comments
							pH	EC	pH	EC			
CQ3	9.05	10.67	10.98	NIL	C ST	C LO O B G	6.26	109.5us	6.32	110.6us	1x 250ml GP, 1x 500mL GP, 1RP	Y	
CQ4	12.30	11.18	11.49	NIL	C ST	C LO O B G	5.34	137.7us	5.31	132.6us	1x 250ml GP, 1x 500mL GP, 1RP	Y	
CQ5			8.59		C S T	C LO O B G					1x 250ml GP, 1x 500mL GP, 1RP		No Access Owner not home
CQ6					C S T	C LO O B G					1x 250ml GP, 1x 500mL GP, 1RP		Covered over in paddock
CQ7			6.73		C S T	C LO O B G					1x 250ml GP, 1x 500mL GP, 1RP		No Access Owner not home
CQ8			7.44	NIL	C S T	C LO O B G					1x 250ml GP, 1x 500mL GP, 1RP		No Access
CQ9					C S T	C LO O B G					1x 250ml GP, 1x 500mL GP, 1RP		Blocked
CQ10			26.87		C S T	C LO O B G					1x 250ml GP, 1x 500mL GP, 1RP		No Access Owner not home
CQ11S	12.15	11.96	12.26	NIL	C S T	C LO O B G	4.97	151.1us	5.00	148.5us	1x 250ml GP, 1x 500mL GP, 1RP	Y	
CQ11D	12.10	12.92	13.31	Y	C S T	C LO O B G	4.82	151.4us	4.85	142.9us	1x 250ml GP, 1x 500mL GP, 1RP	Y	
CQ12			5.98		C S T	C LO O B G					1x 250ml GP, 1x 500mL GP, 1RP		No Access Owner not home
CQ13	11.55	13.60	15.28	NO	C S T	C LO O B G	4.11	161.4us	4.12	162.3us	1x 250ml GP, 1x 500mL GP, 1RP	Y	
CP3					C S T	C LO O B G					1x 250ml GP, 1x 500mL GP, 1RP		Removed.
CP4	12.00	5.04	10.6		C S T	C LO O B G					1x 250ml GP, 1x 500mL GP, 1RP		Blocked
CP5	11.45	4.30	10.27	NIL	C S T	C LO O B G	5.36	122.2us	5.39	124.4	1x 250ml GP, 1x 500mL GP, 1RP		
CP6	11.50	9.84	12.33	NIL	C S T	C LO O B G	4.20	147.2us	4.10	147.4us	1x 250ml GP, 1x 500mL GP, 1RP		
CP7	11.35	1.84	5.31	NO	C S T	C LO O B G	4.72	99.6us	4.69	93.9us	1x 250ml GP, 1x 500mL GP, 1RP		
CP8	13.00	22.32	23.2	NIL	C S T	C LO O B G	5.09	121.0 us	5.14	120.6us	1x 250ml GP, 1x 500mL GP, 1RP		
CP13	11.00	11.86	15.27	NO	C S T	C LO O B G	4.97	153.7us	4.99	157.0us	1x 250ml GP, 1x 500mL GP, 1RP		
CP15	10.45	2.34	3.38	NO	C S T	C LO O B G	5.32	181.8us	5.27	178.3us	1x 250ml GP, 1x 500mL GP, 1RP		
MW7	1.35	14.50	16.33	NO	C S T	C LO O B G	6.84	48.3us	6.72	45.8us	1x 250ml GP, 1x 500mL GP, 1RP	Y	
MW8	1.55	7.44	8.36	NO	C S T	C LO O B G	5.15	69.7us	5.10	67.8us	1x 250ml GP, 1x 500mL GP, 1RP	Y	
MW9	3.35	23.94	24.47	NIL	C S T	C LO O B G	4.24	87.1us	4.23	86.1us	1x 250ml GP, 1x 500mL GP, 1RP	Y	
MW10	2.55	10.37	12.04	NO	C S T	C LO O B G	4.99	112.4us	4.94	111.3us	1x 250ml GP, 1x 500mL GP, 1RP	Y	
MW13	2.20	7.55	7.85	NO	C S T	C LO O B G	3.92	105.9us	3.92	105.4us	1x 250ml GP, 1x 500mL GP, 1RP		
MW16	2.10	8.21	8.41	NO	C S T	C LO O B G	5.00	105.0us	4.89	105.9us	1x 250ml GP, 1x 500mL GP, 1RP		
MW17	2.05	9.80	9.87	NO	C S T	C LO O B G	4.57	118.4us	4.53	116.4us	1x 250ml GP, 1x 500mL GP, 1RP		

Turbidity: C=Clear, S= Slight, T=Turbid (CIRCLE)
pH/EC meter #: V3743

Colour: C=Clear, LO=Light Orange, O=Orange, B=Brown, G=Green (CIRCLE)

*If unable to download logger please provide comment/ explanation above

Signed: [signature]

Sampled by: Leesa + Matt

Spoke to shane about
no Access to the property
to Access all the CQ bores.

ALS Environmental

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
☐BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
☐GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
☐MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
☐MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
☐NEWCASTLE 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com
☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com
☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: Hanson Calga Quarry - 151 Peats Ridge Rd Calga NSW 2250

OFFICE:

PROJECT: Hanson Calga Quarry, Site Water Discharge Dam 1 (A)

ORDER NUMBER: 4502621948

PROJECT MANAGER: Shane Pescud **CONTACT PH:** (02) 4375 1151

SAMPLER: Dale Wilcox **SAMPLER MOBILE:** 0425 290 692

COC emailed to ALS? Provided on reciept of samples **EDD FORMAT (or default):**

Email Reports to: shane.pescud@hanson.com.au & monitoringresults@cbased.com.au

Email involve to: nsw.accounts@hanson.com.au & chanae.delany@hanson.com.au

TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)

☐ Standard TAT (List due date):

☐ Non Standard or urgent TAT (List due date): pH priority 10/09/2019

ALS QUOTE NO.: SYBQ 222-18

COC SEQUENCE NUMBER (Circle) COC: 1 OF: 1

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact? Yes No (N/A)

Free ice / frozen ice bricks present upon receipt? Yes (No) N/A

Random Sample Temperature on Receipt: 21.5 °C

Other comment:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Chanae Delany	Shabila		
DATE/TIME: 9/09/2019	DATE/TIME: 09/09/2019 02:35PM	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	pH	EC	TSS	TDS	Oil & Grease				Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
	Discharge Dam 1 (A) 09092019	09/09/2019 10:32am	W	1x P, 1x O&G	2	1	1	1	1	1				
				TOTAL	2	1	1	1	1	1				

TAT

HT

Environmental Division
Sydney
Work Order Reference
ES1928899
Telephone : +61-2-8784 8555

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1928899**	Page	: 1 of 2
Client	: **HANSON CONSTRUCTION MATERIALS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR SHANE PESCUD	Contact	: Customer Services ES
Address	: BOOLLWARROO PDE SHELLHARBOUR NSW, AUSTRALIA 2529	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 02 4375 1151	Telephone	: +61-2-8784 8555
Project	: HANSON CALGA QUARRY, SITE WATER DISCHARGE DAM 1 (A)	Date Samples Received	: 09-Sep-2019 14:36
Order number	: 4502621948	Date Analysis Commenced	: 09-Sep-2019
C-O-C number	: ----	Issue Date	: 11-Sep-2019 10:42
Sampler	: DALE WILCOX		
Site	: ----		
Quote number	: EN/333		
No. of samples received	: 1		
No. of samples analysed	: 1		

ilac-MRA NATA
Accreditation No. 825
Accredited for compliance with ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			Client sample ID	**DISCHARGE DAM 1 (A) 09092019**	----	----	----	----
			Client sampling date / time	09-Sep-2019 10:32	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**ES1928899-001**	--------	--------	--------	--------
				Result	----	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**8.53**	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**95**	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**63**	----	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	**15**	----	----	----	----
EP020: Oil and Grease (O&G)								
Oil & Grease	----	5	mg/L	<5	----	----	----	----

patrick

CHAIN OF CUSTODY

ALS Environmental

ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
☐BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
☐GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
☐MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
☐MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
☐NEWCASTLE 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com
☐NOWRA 4-13 Geary Place North Nowra NSW 2541 Ph: 02 4423 2063 E: nowra@alsglobal.com
☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: Hanson Calga Quarry - 151 Peats Ridge Rd Calga NSW 2250	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	☐ Standard TAT (List due date):	**FOR LABORATORY USE ONLY (Circle)** Custody seal intact upon receipt? Yes No N/A
OFFICE:		☑ Non Standard or urgent TAT (List due date): pH priority 11/09/2019	Cooling Method: Ice Ice Bricks Blue Ice None
PROJECT: Hanson Calga Quarry, Site Water Discharge Dam 1 (A)	**ALS QUOTE NO.:** SYBQ 222-18	**COC SEQUENCE NUMBER (Circle)** COC: 1 OF: 1	Random Sample Temperature on Receipt? Yes No N/A
ORDER NUMBER: 4502621948			Other comments:
PROJECT MANAGER: Shane Pescud	**CONTACT PH:** (02) 4375 1151		
SAMPLER: Shane Pescud	**SAMPLER MOBILE:** 0425 290 692		
COC emailed to ALS? Provided on reciept of samples	**EDD FORMAT (or default):**		
Email Reports to: shane.pescud@hanson.com.au & monitoringresults@cbased.com.au			
Email involve to: nsw.accounts@hanson.com.au & chanae.delany@hanson.com.au			

RELINQUISHED BY:	RECEIVED BY: Shabila	RELINQUISHED BY:	RECEIVED BY:
DATE/TIME: 11/09/2019	DATE/TIME: 11/09/2019 02:25 PM	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED Including SUITES (NB. Suite Codes must be listed to attract suite price). Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	pH	EC	TSS	TDS	Oil & Grease				Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	Discharge Dam 1 (A) 11092019	11/09/2019 9:30am	W	1x P, 1x O&G	2	1	1	1	1	1				
				TOTAL	2	1	1	1	1	1				

TAT

HT

Environmental Division Sydney
Work Order Reference
ES1929257

Telephone : +61-2-8784 8555

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1929257**	Page	: 1 of 2
Client	: **HANSON CONSTRUCTION MATERIALS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR SHANE PESCUD	Contact	: Customer Services ES
Address	:	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 02 4375 1151	Telephone	: +61-2-8784 8555
Project	: HANSON CALGA QUARRY, SITE WATER DISCHARGE DAM 1 (A)	Date Samples Received	: 11-Sep-2019 14:20
Order number	: 4502621948	Date Analysis Commenced	: 11-Sep-2019
C-O-C number	: ----	Issue Date	: 16-Sep-2019 11:00
Sampler	: SHANE PESCUD		
Site	: ----		
Quote number	: EN/333		
No. of samples received	: 1		
No. of samples analysed	: 1		

Accreditation No. 825
Accredited for compliance with ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			Client sample ID	**Discharge Dam 1 (A) 11092019**	**----**	**----**	**----**	**----**
			Client sampling date / time	11-Sep-2019 09:30	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**ES1929257-001**	**--------**	**--------**	**--------**	**--------**
				Result	----	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**6.18**	**----**	**----**	**----**	**----**
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**93**	**----**	**----**	**----**	**----**
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**64**	**----**	**----**	**----**	**----**
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	**17**	**----**	**----**	**----**	**----**
EP020: Oil and Grease (O&G)								
Oil & Grease	----	5	mg/L	<5	**----**	**----**	**----**	**----**

CHAIN OF CUSTODY

ALS Laboratory: please tick →

ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
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MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 8735 E: mudgee.mail@alsglobal.com
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TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: Hanson Calga Quarry - 151 Peats Ridge Rd Calga NSW 2250	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)	☐ Standard TAT (List due date):	**FOR LABORATORY USE ONLY: (Circle)**
OFFICE:		☐ Non Standard or urgent TAT (List due date): pH priority 18/09/2019	Custody Seal Intact? Yes No N/A
PROJECT: Hanson Calga Quarry, Site Water Discharge Dam 1 (A)	**ALS QUOTE NO.:** SYBQ 222-19	**COC SEQUENCE NUMBER (Circle)**	Free ice / frozen ice bricks present upon receipt? Yes No N/A
ORDER NUMBER: 4502621948		COC: 1	Random Sample Temperature on Receipt: 21.3 °C
PROJECT MANAGER: Shane Pescud	**CONTACT PH:** (02) 4375 1151	OF: 1	Other comment:
SAMPLER: Dale Wilcox	**SAMPLER MOBILE:** 0425 290 692	**RELINQUISHED BY:** Brad Seaman	**RECEIVED BY:** FAS:
COC emailed to ALS? Provided on reciept of samples	**EDD FORMAT (or default):**	DATE/TIME: 17/09/2019	DATE/TIME: 17/9/19 1:20p
Email Reports to: shane.pescud@hanson.com.au & monitoringresults@cbased.com.au		**RELINQUISHED BY:** DATE/TIME:	**RECEIVED BY:** DATE/TIME:
Email Invoive to: nsw.accounts@hanson.com.au & chanae.delany@hanson.com.au			

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	pH	EC	TSS	TDS	Oil & Grease				Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
(1)	Discharge Dam 1 (A) 17092019	17/09/2019 10:00am	W	1x P, 1x O&G	2	1	1	1	1	1				
				TOTAL	2	1	1	1	1	1				

TAT

HT

Environmental Division Sydney
Work Order Reference
ES1929967

Telephone : +61-2-8784 8555

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1929967**	Page	: 1 of 2
Client	: **HANSON CONSTRUCTION MATERIALS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR SHANE PESCUD	Contact	: Customer Services ES
Address	:	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 02 4375 1151	Telephone	: +61-2-8784 8555
Project	: HANSON CALGA QUARRY, SITE WATER DISCHARGE DAM 1 (A)	Date Samples Received	: 17-Sep-2019 13:20
Order number	: ----	Date Analysis Commenced	: 17-Sep-2019
C-O-C number	: ----	Issue Date	: 19-Sep-2019 10:27
Sampler	: Dale Wilcox		
Site	: ----		
Quote number	: EN/333		
No. of samples received	: 1		
No. of samples analysed	: 1		

Accreditation No. 825
Accredited for compliance with ISO/IEC 17025 - Testing

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- General Comments
- Analytical Results

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Signatories

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Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW

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LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			Client sample ID	**Discharge Dam 1 (A) 17092019**	**----**	**----**	**----**	**----**
			Client sampling date / time	17-Sep-2019 10:00	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**ES1929967-001**	**--------**	**--------**	**--------**	**--------**
				Result	----	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**6.35**	**----**	**----**	**----**	**----**
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**86**	**----**	**----**	**----**	**----**
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**72**	**----**	**----**	**----**	**----**
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	**6**	**----**	**----**	**----**	**----**
EP020: Oil and Grease (O&G)								
Oil & Grease	----	5	mg/L	<5	**----**	**----**	**----**	**----**

CHAIN OF CUSTODY

ALS Laboratory: please tick →

ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
GLADSTONE 36 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5800 E: gladstone@alsglobal.com
MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
MELBOURNE 24 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
MURDOCH 27 Sydney Road Mudgee NSW 2850 Ph: 02 8372 6735 E: mudgee.mail@alsglobal.com
NEWCASTLE 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com
NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 02 4423 2063 E: nowra@alsglobal.com
PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: Hanson Calga Quarry - 151 Peats Ridge Rd Calga NSW 2250	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	Standard TAT (List due date):	**FOR LABORATORY USE ONLY (Circle)**
OFFICE:		☑ Non Standard or urgent TAT (List due date): pH results 19/09/2019	Custody Seal Intact? Yes No N/A
PROJECT: Hanson Calga Surface Water Monitoring	**ALS QUOTE NO.:** SYBQ 222-16	**COC SEQUENCE NUMBER (Circle)**	Free ice / frozen ice bricks present upon receipt? Yes No N/A
ORDER NUMBER: 4502621948		COC: 1	Random Sample Temperature on Receipt: 14.3 °C
PROJECT MANAGER: Shane Pescud	**CONTACT PH:** (02) 4375 1151	OF: 1	Other comments:
SAMPLER: Shane Pescud	**SAMPLER MOBILE:** 0425 290 692		
COC emailed to ALS? Provided on reciept of samples	**EDD FORMAT (or default):**		
Email Reports to: shane.pescud@hanson.com.au & monitoringresults@cbased.com.au			
Email invoice to: nsw.accounts@hanson.com.au & chanae.delany@hanson.com.au			

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE/TIME: 18/09/2019	DATE/TIME:	DATE/TIME:	Sangeeta DATE/TIME: 18/09/2019 11:45AM

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).						Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	pH	EC	TSS	TDS	Oil & Grease		Comments on likely contaminant levels, dilutions, or samples requiring specific QC
1	Dam 1 (A)	18/09/2019 7:00am	W	1x P, 1x O&G	2	1	1	1	1	1		
2	Dam 7B/C	18/09/2019 7:15am	W	1x P, 1x O&G	2	1	1	1	1	1		
3	Dam 13 (B)	18/09/2019 7:35am	W	1x P, 1x O&G	2	1	1	1	1	1		
4	Point D Creek	18/09/2019 7:50am	W	1x P, 1x O&G	2	1	1	1	1	1		
5	Point C Spillway	18/09/2019 8:15am	W	1x P, 1x O&G	2	1	1	1	1	1		
				TOTAL	10	5	5	5	5	5		

Environmental Division Sydney
Work Order Reference
ES1930102

Telephone : + 61-2-8784 8555

TAT

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1930102**	Page	: 1 of 2
Client	: **HANSON CONSTRUCTION MATERIALS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR SHANE PESCUD	Contact	: Customer Services ES
Address	: 20 Parker street Carrington 2294	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 02 4375 1151	Telephone	: +61-2-8784 8555
Project	: Hanson Calga Surafce Water Monitoring	Date Samples Received	: 18-Sep-2019 11:45
Order number	: 4502621948	Date Analysis Commenced	: 18-Sep-2019
C-O-C number	: ----	Issue Date	: 25-Sep-2019 11:32
Sampler	: SHANE PESCUD		
Site	: ----		
Quote number	: EN/333		
No. of samples received	: 5		
No. of samples analysed	: 5		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- TDS by method EA-015 may bias high for sample 3 due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			Client sample ID	**Dam 1 (A)**	**Dam 7B/C**	**Dam 13 (B)**	**Point D Creek**	**Point C Spillway**
			Client sampling date / time	18-Sep-2019 07:00	18-Sep-2019 07:15	18-Sep-2019 07:35	18-Sep-2019 07:50	18-Sep-2019 08:15
Compound	*CAS Number*	*LOR*	*Unit*	**ES1930102-001**	**ES1930102-002**	**ES1930102-003**	**ES1930102-004**	**ES1930102-005**
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**5.87**	**5.91**	**6.41**	**5.96**	**6.00**
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**84**	**82**	**66**	**48**	**92**
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**48**	**50**	**78**	**38**	**53**
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	**37**	**36**	**126**	**65**	<5
EP020: Oil and Grease (O&G)								
Oil & Grease	----	5	mg/L	<5	<5	**5**	<5	<5

CHAIN OF CUSTODY

ALS Laboratory: please tick →

ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5699 E: gladstone@alsglobal.com
MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
MELBOURNE 2-4 Wastall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
NEWCASTLE 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com
NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com
PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
TOWNSVILLE 14-15 Desma Court Garbutt QLD 4814 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: Hanson Calga Quarry - 151 Peats Ridge Rd Calga NSW 2250	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	Standard TAT (List due date): ☑ Non Standard or urgent TAT (List due date): pH results 19/09/2019
OFFICE:		
PROJECT: Hanson Calga Surface Water Monitoring	**ALS QUOTE NO.:** SYBQ 222-16	**COC SEQUENCE NUMBER (Circle)** COC: 1 OF: 1
ORDER NUMBER: 4502621948		
PROJECT MANAGER: Shane Pescud	**CONTACT PH:** (02) 4375 1151	
SAMPLER: Shane Pescud	**SAMPLER MOBILE:** 0425 290 692	
COC emailed to ALS?.Provided on reciept of samples	**EDD FORMAT (or default):**	
Email Reports to: shane.pescud@hanson.com.au & monitoringresults@cbased.com.au		
Email invoive to: nsw.accounts@hanson.com.au & chanae.delany@hanson.com.au		

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact?	Yes	No	N/A
Free ice / frozen ice bricks present upon receipt?	Yes	No	N/A
Random Sample Temperature on Receipt	°C		
Other comments:			

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE/TIME: 19/09/2019	DATE/TIME: FAX 19/9/19 10:45	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	pH	EC	TSS	TDS	Oil & Grease				Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	Dam 1 (A)	19/09/2019 6:45am	W	1x P, 1x O&G	2	1	1	1	1	1				HT
2	Dam 7B/C	19/09/2019 7:00am	W	1x P, 1x O&G	2	1	1	1	1	1				
3	Dam 13 (B)	19/09/2019 7:15am	W	1x P, 1x O&G	2	1	1	1	1	1				
4	Point D Creek	19/09/2019 7:30am	W	1x P, 1x O&G	2	1	1	1	1	1				
5	Point C Spillway	19/09/2019 7:50am	W	1x P, 1x O&G	2	1	1	1	1	1				
				TOTAL	10	5	5	5	5	5				

Environmental Division Sydney
Work Order Reference
ES1930294

Telephone : + 61-2-8784 8555

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1930294**	Page	: 1 of 2
Client	: **HANSON CONSTRUCTION MATERIALS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR SHANE PESCUD	Contact	: Customer Services ES
Address	: ACCOUNTS PAYABLE LOCKED BAG 5018 PARRAMATTA NSW 2124	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 02 4375 1151	Telephone	: +61-2-8784 8555
Project	: Hanson Calga Surface Water Monitoring	Date Samples Received	: 19-Sep-2019 10:45
Order number	: 4502621948	Date Analysis Commenced	: 19-Sep-2019
C-O-C number	: ----	Issue Date	: 24-Sep-2019 10:32
Sampler	: SHANE PESCUD		
Site	: ----		
Quote number	: EN/333		
No. of samples received	: 5		
No. of samples analysed	: 5		

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Accreditation No. 825
Accredited for compliance with ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- TDS by method EA-015 may bias high for samples 4 and 5 due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			Client sample ID	**Dam 1 (A)**	**Dam 7B/C**	**Dam 13 (B)**	**Point D Creek**	**Point C Spillway**
			Client sampling date / time	19-Sep-2019 06:45	19-Sep-2019 07:00	19-Sep-2019 07:15	19-Sep-2019 07:30	19-Sep-2019 07:50
Compound	*CAS Number*	*LOR*	*Unit*	**ES1930294-001**	**ES1930294-002**	**ES1930294-003**	**ES1930294-004**	**ES1930294-005**
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**6.92**	**7.83**	**6.81**	**6.04**	**6.35**
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**91**	**91**	**98**	**42**	**79**
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**50**	**57**	**74**	**36**	**60**
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	**66**	**69**	**9**	**55**	**19**
EP020: Oil and Grease (O&G)								
Oil & Grease	----	5	mg/L	<5	<5	<5	<5	<5

CHAIN OF CUSTODY

ALS Laboratory: please tick →

ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
MACKAY 75 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
NEWCASTLE 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com
NOWRA 4-10 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com
PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: Hanson Calga Quarry - 151 Peats Ridge Rd Calga NSW 2250	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g., Ultra Trace Organics) ☐ Standard TAT (List due date): ☑ Non Standard or urgent TAT (List due date): pH priority 23/09/2019
OFFICE:	**ALS QUOTE NO.:** SYBQ 222-19
PROJECT: Hanson Calga Quarry, Site Water Discharge Dam 1 (A)	**COC SEQUENCE NUMBER (Circle)** COC: 1
ORDER NUMBER: 4502621948	OF: 1
PROJECT MANAGER: Shane Pescud — **CONTACT PH:** (02) 4375 1151	
SAMPLER: Dale Wilcox — **SAMPLER MOBILE:** 0425 290 692	
COC emailed to ALS? Provided on reciept of samples — **EDD FORMAT (or default):**	**RELINQUISHED BY:**
Email Reports to: shane.pescud@hanson.com.au & monitoringresults@cbased.com.au	DATE/TIME: 23/09/2019
Email Invoice to: nsw.accounts@hanson.com.au & chanae.delany@hanson.com.au	**RECEIVED BY:** TNT DATE/TIME: 23/9/19 9:30
COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:	**RELINQUISHED BY:** DATE/TIME: — **RECEIVED BY:** DATE/TIME:

FOR LABORATORY USE ONLY (Circle)
Custody Seal Intact? Yes No
Free ice / frozen ice bricks present upon receipt? Yes No
Random Sample Temperature on Receipt: °C
Other comment:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	pH	EC	TSS	TDS	Oil & Grease				
1	Discharge Dam 1 (A) 23092019	23/09/2019 6:50am	W	1x P, 1x O&G	2	1	1	1	1	1				Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
				TOTAL	2	1	1	1	1	1				

Environmental Division Sydney
Work Order Reference
ES1930691

Telephone : +61-2-8784 8555

HT

TAT

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1930691**	Page	: 1 of 2
Client	: **HANSON CONSTRUCTION MATERIALS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR SHANE PESCUD	Contact	: Customer Services ES
Address	: PO BOX 206 BATHURST NSW,AUSTRALIA 2795	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 02 4375 1151	Telephone	: +61-2-8784 8555
Project	: HANSON CALGA QUARRY, SITE WATER DISCHARGE POINT 1 (A)	Date Samples Received	: 23-Sep-2019 09:30
Order number	: 4502621948	Date Analysis Commenced	: 23-Sep-2019
C-O-C number	: ----	Issue Date	: 25-Sep-2019 11:32
Sampler	: Dale Wilcox		
Site	: ----		
Quote number	: EN/333		
No. of samples received	: 1		
No. of samples analysed	: 1		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			Client sample ID	**Discharge Dam 1 (A) 23092019**	----	----	----	----
			Client sampling date / time	23-Sep-2019 06:50	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**ES1930691-001**	--------	--------	--------	--------
				Result	----	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**6.54**	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**85**	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**53**	----	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	**28**	----	----	----	----
EP020: Oil and Grease (O&G)								
Oil & Grease	----	5	mg/L	<5	----	----	----	----

ALS ENVIRONMENTAL

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
☐ BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
☐ GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
☐ MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
☐ MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
☐ MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
☐ NEWCASTLE 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com
☐ NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com
☐ PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
☐ SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
☐ TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
☐ WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: Hanson Calga Quarry - 151 Peats Ridge Rd Calga NSW 2250	TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)	☐ Standard TAT (List due date): ☑ Non Standard or urgent TAT (List due date): pH priority 30/09/2019	FOR LABORATORY USE ONLY (Circle)
OFFICE:			Custody Seal Intact? Yes No N/A
PROJECT: Hanson Calga Quarry, Site Water Discharge Dam 1 (A)	ALS QUOTE NO.: SYBQ 222-19	COC SEQUENCE NUMBER (Circle)	Free ice / frozen ice bricks present upon receipt? Yes No N/A
ORDER NUMBER: 4502621948		COC: 1	Random Sample Temperature on Receipt: °C
PROJECT MANAGER: Shane Pescud	CONTACT PH: (02) 4375 1151	OF: 1	Other comment:

SAMPLER: Dale Wilcox	SAMPLER MOBILE: 0425 290 692	RELINQUISHED BY: [signature]	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY: Wanda
COC emailed to ALS? Provided on reciept of samples	EDD FORMAT (or default):				
Email Reports to: shane.pescud@hanson.com.au & monitoringresults@cbased.com.au		DATE/TIME: 30/09/2019	DATE/TIME:	DATE/TIME:	DATE/TIME: 300919 1:30
Email invoive to: nsw.accounts@hanson.com.au & chanae.delany@hanson.com.au					

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	pH	EC	TSS	TDS	Oil & Grease				Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	Discharge Dam 1 (A) 30092019	30/09/2019 7am	W	1x P, 1x O&G	2	1	1	1	1	1				
					TOTAL 2	1	1	1	1					

TAT

Environmental Division
Sydney
Work Order Reference
ES1931791

Telephone : + 61-2-8784 8555

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1931791**	Page	: 1 of 2
Client	: **HANSON CONSTRUCTION MATERIALS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR SHANE PESCUD	Contact	: Customer Services ES
Address	: PO BOX 206 BATHURST NSW,AUSTRALIA 2795	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 02 4375 1151	Telephone	: +61-2-8784 8555
Project	: HANSON CALGA QUARRY, SITE WATER DISCHARGE POINT 1 (A)	Date Samples Received	: 30-Sep-2019 13:30
Order number	: 4502621948	Date Analysis Commenced	: 30-Sep-2019
C-O-C number	: ----	Issue Date	: 02-Oct-2019 13:08
Sampler	: DALE WILCOX		
Site	: ----		
Quote number	: EN/333		
No. of samples received	: 1		
No. of samples analysed	: 1		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			Client sample ID	**Discharge Dam 1 (A) 30092019**	**----**	**----**	**----**	**----**
			Client sampling date / time	30-Sep-2019 07:00	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**ES1931791-001**	**--------**	**--------**	**--------**	**--------**
				Result	----	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**6.42**	**----**	**----**	**----**	**----**
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**84**	**----**	**----**	**----**	**----**
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**44**	**----**	**----**	**----**	**----**
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	**18**	**----**	**----**	**----**	**----**
EP020: Oil and Grease (O&G)								
Oil & Grease	----	5	mg/L	<5	**----**	**----**	**----**	**----**